REMARKS

The Office Action dated April 21, 2004 has been carefully considered by the applicant.

By the present amendment, the specification has been amended to correct a typographical error therein. No new matter has been added by this amendment.

In the Office Action, Claim 1 has been rejected under 35 U.S.C. § 102(b) as being anticipated by Jung et al U.S. Patent Number 6,053,213. Claim 2 has been rejected under 35 U.S.C. § 102(b) as being anticipated by Doane et al U.S. Patent Number 2,449,369. Claim 3 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Odru U.S. Patent Number 6,550,502.

By the present amendment, Claim 1 is amended, Claims 2 and 3 are cancelled, and Claims 4-9 are added to more particularly point out and distinctly claim the subject matter of the present invention, and render the same allowable over applied references.

Claim 1

Claim 1, as amended, recites a hose with corrugated metal tube for conveying highly permeable fluid. The hose comprises an inner layer having a corrugated metal tube having corrugation hills and valleys, wherein the corrugation hills and valleys are discontinuous respectively. The discontinuity between hills and valleys of the corrugation is most clearly shown in Figures 1(A) and 2. In the preferred embodiment, the metal tube is annularly corrugated. An outer layer circumscribes a radial outer side of the inner layer. In addition, the reinforced layer having filament members is included in the outer layer. The reinforcing filament members are braided at a braid angle with respect to an axis which is a low angle, 40 degrees or lower. The reinforced layer thereby generates sufficient resistance to pressure exerted repeatedly by fluid conveyed.

Claim 1 is not anticipated or rendered obvious by the Jung et al '213 reference for the following reasons. Jung et al '213 teaches a flexible pipe for use in oil production. The flexible pipe includes an inner corrugated metal tube (1) that has helical corrugation on its outer face. The corrugated tube is surrounded by a pressure vault (2) consisting of

a helical winding of shaped interlocked wire (8). The pressure vault is surrounded by an inner armoring layer (3), an intermediate sheath (4), an outer armoring layer (5), and an outer sheath (6). The intermediate sheath and outer sheath are made of polymer. The inner and outer armoring layers are formed of layers of short pitch helical winding wound in opposite directions.

Jung et al '213 fails to teach or suggest a hose with a corrugated metal tube having corrugation hills and valleys that are discontinuous respectively. Conversely, Jung et al '213 teach a corrugated tube (1) having helical corrugations. Contrary to Jung et al '213, if internal pressure is exerted on the inner layer of the hose with corrugated metal tube of Claim 1, it will not kink, and therefore the pressure resistance of the hose is secured. This arrangement and its advantages are not taught or suggested by Jung et al '213.

In addition, Jung et al '213 fails to teach or suggest a hose with corrugated metal tube that comprises a reinforced layer having reinforcing filament members that are braided at a braid angle with respect to an axis which is a low angle, 40 degrees or lower. Conversely, Jung et al '213 teaches inner and outer armoring layers (3, 5) which each consists of two oppositely wound layers of short pitch helical winding. These layers are not braided. Rather, they are clearly shown as overlapping. Jung et al '213 thus fails to teach the many advantages described in the present application that derive from braiding reinforcing filament members, and more specifically braiding filament members at 40 degrees or lower. Briefly, the axial expansion and contraction of the hose is more efficiently restrained by the hose of Claim 1, than by the flexible pipe taught by Jung et al '213.

The failure of Jung et al '213 to teach the combination of elements recited in Claim 1 is not surprising based on the fact that Jung et al '213 is directed to a different purpose than the hose with corrugated metal tube of the present invention. That is, Jung et al '213 is directed to flexible pipes used in oil production, whereas the hose with corrugated metal tube of the present invention is directed to conveyance of highly permeable fluid where an internal pressure is exerted on the hose repeatedly by the fluid

that is being conveyed. Jung et al '213 fails to address many of the problems addressed by the invention of the present application, and specifically Claim 1.

Claim 1 is further not anticipated or rendered obvious by Doane et al '369 for the following reasons. Doane et al '369 teaches a flexible metal hose that includes corrugated metal tubing (3) covered by a coating of rubber cement (7), a wrapping of rubber tape (9), a braided wire sheath (4), a second wrapping of rubber tape (10), a flexible pressure resistant armor (5) and a fitting (6). The braided wire sheath comprises a simple reinforced layer which is not braided at a braid angle with respect to an axis which is a low angle, i.e. 40 degrees or lower. Conversely, Doane et al '369 simply discloses a braided layer of wire, and does not elaborate on the desirability of braiding at a low angle, or the many advantages served by such an angle.

That Doane et al '369 clearly fails to teach or suggest a layer of reinforcing filament members that are braided at a low angle is not surprising, as Doane et al '369 is directed to a completely different purpose than the invention of Claim 1, and the present application. Doane et al '369 teaches a flexible metallic hose designed to damp out vibration. The invention in Doane et al '369 is related to providing a coating of rubber cement or rock wool to eliminate vibrations. Doane et al '369 does not disclose a reinforced layer of reinforcing filament members, and further does not even realize the importance of providing a low braid angle of the wire sheath, and is not concerned with providing anything other than a structurally supportive criss-crossed wire material. There is no teaching or suggestion whatsoever as to having a reinforced layer or filament members braided at a low braid angle, and, as such, the hose of Doane et al '369 is not suited, nor intended to convey highly permeable fluids, as is the hose with corrugated metal tube of Claim 1.

Claim 1 is further not anticipated or rendered obvious by Odru '502. Odru '502 teaches a multi-layer tube having a tube surrounded by a thermo-plastic polymer layer (1) and several pressure resisting layers that consist of thin groups of fibers wound at a high angle in relation to the axis of the tube (2, 4, 6 and 8), and fibers wound at a small angle in relation to the axis of the tube (3, 5, 7). Odru '502 however fails altogether to teach the

combination of a corrugated metal tube and a reinforcing layer having reinforcing filament members that are braided. The fiber layers of Odru '502 are not braided, and no corrugated metal tube is taught or suggested.

As with the above-references, Odru '502 is directed to a completely different purpose than the invention of the present application. Odru '502 is directed towards off-shore oil prospecting, and not to conveying highly permeable fluid, as is the invention of Claim 1.

Thus, in accordance with the comments above, none of the applied references, alone or in combination, anticipate or render obvious the unique and advantageous combination of elements in Claim 1. Claim 1 is thus believed allowable. Such action is respectfully requested.

Claim 4

Claim 4 depends directly from Claim 1, and is thus believed allowable for the reasons as stated above, as well as the detailed subject matter cited therein.

Claim 5

Claim 5 recites a hose with corrugated metal tube for conveying highly permeable fluid. An inner layer comprises a corrugated metal tube having corrugation hills and valleys, wherein the corrugation hills and valleys are discontinuous respectively. An outer layer circumscribes a radial outer side of the inner layer. A reinforced layer has reinforcing filament member or reinforcing filament members and is included in the outer layer. A first reinforced ply and a second reinforced ply are included in the reinforced layer. In either one of the first and the second reinforced plies, the reinforcing filament member or the reinforcing filament members are arranged at a braid angle or winding angle with respect to an axis which is lower than a neutral angle. In the other thereof the reinforcing filament member or the reinforcing filament members are arranged at a braid angle or a winding angle with respect to an axis which is higher than a neutral angle, so that the reinforced layer generates sufficient resistance to pressure exerted repeatedly by fluid conveyed.

The cited references, alone or in combination, do not anticipate or render obvious the invention of Claim 5 for the following reasons. First, many of the distinctions pointed out regarding Claim 1 above are similarly applicable to Claim 5. None of the applied references teach or suggest the structure or desirability of a hose having both a reinforcing layer formed of reinforcing filament members and a corrugated metal tube with discontinuous hills and valleys.

In addition, none of the cited references teach or suggest a hose with corrugated metal tube having both a corrugated metal tube and a first and second reinforced ply included in the reinforced layer and having reinforcing filament members arranged in the first layer at an angle lower than a neutral angle with respect to an axis, and in the second ply reinforcing filament members arranged at a braid or winding angle that is higher than a neutral angle with respect to an axis. The combination of a hose having a corrugated tube with reinforcing filament members arranged at the specified angles is unique and has been found to be highly advantageous. As discussed above, none of the applied references teach or suggest this unique arrangement.

Claim 5 is thus believed allowable. Such action is respectfully requested.

Claims 6-8

Claims 6-8 depend directly from Claim 5 and are thus believed allowable for the reasons stated above, as well as the subject matter recited therein.

Claim 9

Claim 9 recites a hose with corrugated metal tube which, similar to the claims recited above, includes several elements not shown in the prior art references. In addition, none of the applied references teach or suggest a reinforced layer, which is included in the outer layer, having reinforcing filament members, and having at least one ply of canvas, the ply of canvas being constructed by warp or longitudinal reinforcing filament member or members extending in a longitudinal direction of the hose, substantially parallel to an axis, and weft or lateral reinforcing filament member or members extending in a circumferential direction of the hose, substantially perpendicular to an axis, the reinforced layer thereby generating sufficient resistance to pressure exerted

repeatedly by fluid conveyed therein. Per the descriptions of the prior art provided above, none of the applied references teach or suggest this arrangement.

Claim 9 is thus believed allowable for the reasons stated above.

The present application is thus believed in condition for allowance with Claims 1 and 4-9. Such action is respectfully requested.

Respectfully submitted,

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